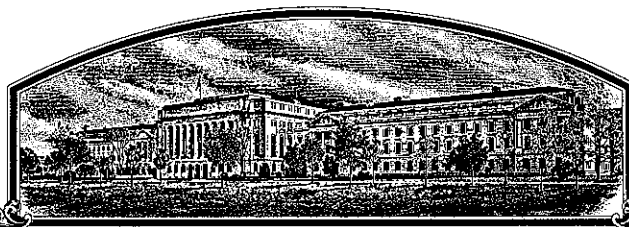


No.

9000036



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**E. I. du Pont de Nemours & Co.**

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (T. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'W20'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 30th day of July in the year of our Lord one thousand nine hundred and ninety-three.

Attest:

*Kenneth Evans*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*[Signature]*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

**APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE**  
(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate)		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.	3. VARIETY NAME
E. I. du Pont de Nemours and Company		W20	W20
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP)		5. PHONE (include area code)	<b>FOR OFFICIAL USE ONLY</b> PVPO NUMBER <u>9000036</u> Filing Date <u>Nov. 22, 1989</u> <input type="checkbox"/> A.M. <input type="checkbox"/> P.M. Filing and Examination Fee <u>\$2150.-</u> Date <u>Nov. 22, 1989</u> Certificate Fee <u>\$250.00</u> Date <u>July 2, 1993</u>
1007 Market Street Wilmington, DE 19898		(302) 992-4927	
6. GENUS AND SPECIES NAME	7. FAMILY NAME (Botanical)		
<u>Glycine max (L.) Merr.</u>	<u>Leguminosae</u>		
8. CROP KIND NAME (Common Name)	9. DATE OF DETERMINATION		
<u>Soybean</u>	<u>6-16-87</u>		
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)			
<u>Corporation</u>			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION		12. DATE OF INCORPORATION	
<u>Delaware</u>		<u>9-2-15</u>	

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Bruce W. Morrissey  
E.I. du Pont de Nemours and Company - Legal Department  
Barley Mill Plaza - P17-2216  
Wilmington, DE 19898

PHONE (include area code): (302) 992-4927

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

- a. ☒ Exhibit A. Origin and Breeding History of the Variety  
 b. ☒ Exhibit B. Novelty Statement  
 c. ☒ Exhibit C. Objective Description of Variety  
 d. ☐ Exhibit D. Additional Description of Variety  
 e. ☒ Exhibit E. Statement of the Basis of Applicant's Ownership  
 f. ☒ Seed Sample (2,500 viable untreated seeds) Date Seed Sample mailed to Plant Variety Protection Office 11-21-89  
 g. ☒ Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States"

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act)

☐ YES (If "YES," answer items 16 and 17 below) ☒ NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

☐ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?

☒ YES (If "YES," through ☐ Plant Variety Protection Act ☒ Patent Act Give date 9-22-88)  
☐ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?

☐ YES (If "YES," give names of countries and dates)  
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT (Owner(s))	CAPACITY OR TITLE	DATE
<u>Donald A. Haas</u>	Secretary Patent Board	11-21-89
SIGNATURE OF APPLICANT (Owner(s))	CAPACITY OR TITLE	DATE

14A. Exhibit A - Origin and Breeding History

W20 soybean [*Glycine max* (L.) Merr.] is a true-breeding mutant of the variety 'Williams' developed by the Agricultural Products Department of E. I. du Pont de Nemours and Company. PVP was sought in 1989 because of its unusually high resistance to certain sulfonylurea herbicides.

**14.A.1 AND 14.A.2:**

W20 originated as a single plant selection from an M2 population of Williams treated with a normally lethal concentration of chlorsulfuron (Sebastian et al., 1989). W20 survived the chlorsulfuron treatment and was allowed to reach maturity. M3 seed of W20 was rescreened and found to be uniformly resistant to chlorsulfuron. M4 seed of the W20 line was tested and found to be resistant to treatments of other sulfonylureas (including Harmony®, Express®, and chlorimuron ethyl) that were highly injurious to wild type soybeans (Sebastian et al., 1989).

**14.A.3**

W20 appears to be stable and uniform through five generations of selfing. No noticeable variants were observed.

**14.A.4.**

M3 family uniformity was demonstrated by showing that all 30 seeds from a single M2 plant were resistant. Genetic studies concluded that sulfonylurea resistance in W20 is inherited as a single semidominant allele named Als1. Biochemical studies indicate that Als1 confers resistance to sulfonylureas at the level of acetolactate synthase, the herbicidal site of action (Sebastian et al, 1989).

REFERENCE: S. Sebastian et al, *Crop Science* 29, 1403-1408 (1989) (attached).

PV 9000036

Exhibit B  
6 May 1992  
JSS

U.S. DEPARTMENT OF AGRICULTURE  
PLANT VARIETY PROTECTION OFFICE

PVP APPLICATION NO. 9000036                      EXAMINER: JEFFREY L. STRACHAN  
TITLE: 'W20' SOYBEAN  
FILING DATE: NOVEMBER 22, 1989                      WILMINGTON, DELAWARE 19898  
OUR REFERENCE: BB-1008 (PVP)                      DATE: APRIL 15, 1992

Honorable Secretary of Agriculture  
Beltsville, MD 20705-2351  
Sir:

REQUEST FOR RECONSIDERATION

In response to the Communication of November 15, 1991, Applicant offers the following comments and information, and respectfully requests reconsideration of this application. Applicant notes that time period for response was set to run on May 16, 1992.

REMARKS

To summarize the current status of the application, Examiner Strachan has issued a statement of findings after an initial examination following an update of the soybean database. It has been found that Applicant's Novelty Statement (Exhibit B) requires revision, and the Examiner has outlined three general ways in which Applicant might prove novelty. Further, it has been suggested that Applicant could establish novelty through a suitable comparison to the variety "Govan".

Applicant is highly appreciative of the Examiner's review and suggestion. Applicant believes that path (3) - "choose the variety believed to be the most similar to the application variety and explain how it differs from it" - is in fact the appropriate means to establish novelty. Applicant believes, however, that the most similar variety is "Williams" with "William 82" an exceedingly close second choice. Applicant will therefore demonstrate novelty by extensive comparison to these two varieties of soybean, and at the same time provide evidence of the resistance of "W20" to sulfonylurea herbicidal compounds.

The "W20" variety was derived from mutagenesis of "Williams", it is therefore a near-isogenic line of Williams. Hence Williams is the most closely related soybean line to W20 and should be used for comparison purposes in the examination of the plant variety protection registration application.

"Williams 82" is also a closely-related near-isogenic line for comparison to W20. Williams 82 was derived by backcrossing the *Rps1<sup>k</sup>* gene from Kingwa into Williams. The *Rps1<sup>k</sup>* gene confers resistance to *Phytophthora megasperma* f.sp. *glycinea*. Since 7 cycles of backcrossing were performed, Williams 82 should be approximately 99% similar to both Williams and W20 in terms of genetic background. Williams 82 and Williams are indistinguishable in terms of reaction to sulfonylurea herbicides and both lack the high degree of resistance found in W20. The preparation of "W20" by mutational breeding from "Williams" is detailed in U.S. Patent 5,084,082 columns 16 (lines 18-55) and 17 (lines 26-54 and TABLE II). A copy is attached for the Examiner's convenience.

Although "Williams" and "Williams 82" are the most similar varieties to "W20" there are nevertheless major differences between these varieties and "W20". Most significant is the trait of sulfonylurea herbicide resistance. Applicant has established this difference through preemergent and postemergent applications of a number of sulfonylurea herbicide compounds in comparative tests of "W20" vs. "Williams" and "W20" vs. "Williams 82". In a preemergent comparative test of herbicidal resistance, twenty seeds of each of "Williams" and "W20" were soaked for 14 hours in a solution of 1 ppm chlorsulfuron (2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)aminocarbonyl] benzenesulfonamide). As a control, twenty additional seeds of each line were soaked for 14 hours in distilled water. At the end of this period, the seeds were completely imbibed with either chlorsulfuron or distilled water. Imbibed seeds were then planted in pots (4" x 4") containing a standard peat-based potting soil (Metro-Mix 350) at a density of 10 seeds per pot. This gave a total of 2 pots for each of 6 treatments (3 genotypes x 2 herbicide treatments). Pots were placed in the greenhouse and watered daily. At 7 days after treatment, it was observed that control plants were fairly uniform in appearance and had reached the first unifoliolate stage. Of the plants

treated with chlorsulfuron, only the "W20" plants were forming leaves. The health of the "W20" plants was not visibly different than that of the controls. However, chlorsulfuron-treated plants of "Williams" had emerged and opened cotyledons but did not develop true leaves. Since plant-to-plant variation within pots was negligible, pots were thinned back to 4 to 5 plants per pot to permit further development without crowding. At 14 days after the seed soak treatment, controls and chlorsulfuron-treated "W20" plants were still developing normally and were at the second trifoliolate stage. A visual rating of herbicide injury of each pot was given using the control plants as the standard of 0% injury. Injury was based on the extent of true leaf development past the stage of cotyledon expansion.

The difference between "W20" and the standard soybean cultivar Williams was very dramatic (see Table 1 below). Chlorsulfuron-treated "W20" plants were indistinguishable from controls (0% injury). Chlorsulfuron-treated "Williams" plants had only vestigial leaves that were completely arrested in development; these plants had still not developed past the point of cotyledon opening (100% injury). Statistical analysis of the data was practically meaningless since lines were either completely inhibited or completely unaffected by the herbicide treatment.

TABLE 1: INJURY OF CONTROL AND CHLORSULFURON-TREATED SOYBEAN PLANTS AT 14 DAYS AFTER SEED-SOAK  
TREATMENT

VARIETY	CHLORSULFURON RATE (PPM)	POT	%INJURY (mean of 4-5 plants)
WILLIAMS	0	1	0
		2	
W20	0	1	0
		2	0
WILLIAMS	1	1	100
		2	100
W20	1	1	0
		2	0

A postemergent comparison of "W20" and "Williams" has also been conducted using another sulfonylurea herbicide, thifensulfuron methyl (methyl 3-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]-amino]sulfonyl]-2-thiophene-carboxylate). Four plastic tubs (18x11x5 inches) were filled with a sandy loam-peat-vermiculite mix and rows of W20 and Williams soybeans were planted lengthwise in each. Two tubs were also planted with rows of pigweed, velvetleaf and lambsquarters. The other two were planted with cocklebur and morningglory (while these weed species were included in the test, results will not be reported herein except to say that weed control on all species was good to excellent at both rates tested). Plantings were made April 1, 1991 and when the soybeans reached the first trifoliate leaf stage (April 15, 1991), treatments were applied as a postemergence spray at rates of 4 and 17 g/ha to the soybeans and weeds. Surfactant X-77 was included at 0.25%. A tub of each was planted and left untreated for use as a control. The results are presented in Table 2 below:

TABLE 2. RESPONSE OF W20 AND WILLIAMS SOYBEANS TO  
4 AND 17 g/ha THIFENSULFURON METHYL POSTEMERGENCE

<u>VARIETY</u>	<u>CONTROL</u>	<u>Percent injury</u>	
		<u>4 g/ha</u>	<u>17 g/ha</u>
Williams	0	0	60-70
W20	0	0	0

Thifensulfuron methyl had little or no effect on either Williams or W20 soybeans at 4 g/ha 2-3 weeks after treatment. However, at 17 g/ha, Williams soybeans showed unacceptable injury (60-70%). Soybean growing points were killed and new growth had to emerge from the leaf axils. In contrast, W20 soybeans showed no injury; after 2-3 weeks growing points were unaffected. These data demonstrate that even with thifensulfuron methyl, a compound used commercially for weed control in soybeans, W20 soybeans are uninjured at rates that cause severe injury to wild-type soybeans.

Detailed comparisons of "W20" and "Williams 82" have also been conducted to distinguish the two varieties. These data are incorporated in U.S. Patent 5,084,082 (attached). The

Examiner's attention is directed to Table VI (column 34), Table VII (column 36), Table VII-A (column 37) and Table IX (column 39). These data clearly establish that "W20" can withstand both preemergent and postemergent application of a number of commercial sulfonylurea herbicidal compounds. Side-by-side comparison shows that "Williams 82" suffers agronomic injury while "W20" is generally not significantly injured.

With regard to agronomic traits, growout of "W20" and "Williams" at Stine Labs, Newark, Delaware in the summer of 1989 provide the following comparisons:

<u>Trait</u>	<u>W20</u>	<u>Williams</u>
Height	2-3 inches shorter	
Maturity	2.5 days earlier	
Lodging	10% more lodging	
Yield		5% greater

Applicant has amended the Novelty Statement of Exhibit B through detailed comparisons of "W20" and the most similar soybean varieties, "Williams" and "Williams 82". Applicant believes it has established the protectability of soybean variety "W20", and the early issuance of a notice of allowance of plant variety protection is solicited.

Respectfully submitted,

*Bruce W Morrissey*

Bruce W. Morrissey  
Attorney/Applicant's  
Representative  
Telephone: (302) 992-4927

Attachment  
21/dmj



U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
LIVESTOCK, MEAT, GRAIN & SEED DIVISION  
PLANT VARIETY PROTECTION OFFICE  
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY  
SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) E. I. du Pont de Nemours and Company	TEMPORARY DESIGNATION W20	VARIETY NAME W20
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) 1007 Market Street Wilmington, DE 19898		FOR OFFICIAL USE ONLY PVPO NUMBER 9000036

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., ).

## 1. SEED SHAPE:



1 = Spherical (L/W, L/T, and T/W ratios =  $< 1.2$ )  
3 = Elongate (L/T ratio  $> 1.2$ ; T/W =  $< 1.2$ )

2 = Spherical Flattened (L/W ratio  $> 1.2$ ; L/T ratio =  $< 1.2$ )  
4 = Elongate Flattened (L/T ratio  $> 1.2$ ; T/W  $> 1.2$ )

## 2. SEED COAT COLOR: (Mature Seed)

1 = Yellow

2 = Green

3 = Brown

4 = Black

5 = Other (Specify) \_\_\_\_\_

## 3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

1 = Dull ('Corsoy 79'; 'Braxton')

2 = Shiny ('Nebsoy'; 'Gasoy 17')

## 4. SEED SIZE: (Mature Seed)

Grams per 100 seeds

(this is the seed size in one environment only)

## 5. HILUM COLOR: (Mature Seed)

RWS 8-11-92

6 ☒

1 = Buff

2 = Yellow

3 = Brown

4 = Gray

5 = Imperfect Black

☒ 6 = Black

7 = Other (Specify) \_\_\_\_\_

## 6. COTYLEDON COLOR: (Mature Seed)

1 = Yellow

2 = Green

## 7. SEED PROTEIN PEROXIDASE ACTIVITY:

☐

1 = Low

2 = High

## 8. SEED PROTEIN ELECTROPHORETIC BAND:

☐1 = Type A (SP<sup>1a</sup>)2 = Type B (SP<sup>1b</sup>)

## 9. HYPOCOTYL COLOR:

1 = Green only ('Evans'; 'Davis')

2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')

3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')

4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

## 10. LEAFLET SHAPE:

1 = Lanceolate

2 = Oval

3 = Ovate

4 = Other (Specify) \_\_\_\_\_

## 11. LEAFLET SIZE:

☒ 21 = Small ('Amsoy 71'; 'A5312')  
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

## 12. LEAF COLOR:

☒ 21 = Light Green ('Weber'; 'York')  
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

## 13. FLOWER COLOR:

☒ 1

1 = White

2 = Purple

3 = White with purple throat

## 14. POD COLOR:

☒ 1

1 = Tan

2 = Brown

3 = Black

## 15. PLANT PUBESCENCE COLOR:

☒ 2

1 = Gray

2 = Brown (Tawny)

## 16. PLANT TYPES:

☒ 21 = Slender ('Essex'; 'Amsoy 71')  
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

## 17. PLANT HABIT:

☒ 31 = Determinate ('Gnome'; 'Braxton')  
3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

2 = Semi-Determinate ('Will')

## 18. MATURITY GROUP:

☒ 0 ☒ 61 = 000  
9 = VI2 = 00  
10 = VII3 = 0  
11 = VIII4 = 1  
12 = IX5 = II  
13 = X

6 = III

7 = IV

8 = V

## 19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

## BACTERIAL DISEASES:

☒ 0Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)☒ 0Bacterial Blight (*Pseudomonas glycines*)☒ 0Wildfire (*Pseudomonas tabaci*)

## FUNGAL DISEASES:

☒ 0Brown Spot (*Septoria glycines*)Frog-eye Leaf Spot (*Corynespora cajinal*)☒ 0

Race 1

☐

Race 2

☐

Race 3

☐

Race 4

☐

Race 5

☐

Other (Specify)

☒ 0Target Spot (*Corynespora cassicola*)☒ 0Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☒ 0Powdery Mildew (*Microsphaera diffusa*)☒ 0Brown Stem Rot (*Cephalosporium gregetum*)☒ 0Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

## FUNGAL DISEASES: (Continued)

☒ Pod and Stem Blight (*Diaporthe phaseolorum* var. *sojae*)  
☒ Purple Seed Stain (*Cercospora kikuchii*)  
☐ Rhizoctonia Root Rot (*Rhizoctonia solani*)  
 Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)  
☒ Race 1   ☒ Race 2   ☐ Race 3   ☐ Race 4   ☒ Race 5   ☐ Race 6   ☒ Race 7  
☒ Race 8   ☒ Race 9   ☒ Other (Specify) should be same as Williams but not tested

## VIRAL DISEASES:

☐ Bud Blight (Tobacco Ringspot Virus)  
☐ Yellow Mosaic (Bean Yellow Mosaic Virus)  
☐ Cowpea Mosaic (Cowpea Chlorotic Virus)  
☐ Pod Mottle (Bean Pod Mottle Virus)  
☐ Seed Mottle (Soybean Mosaic Virus)

## NEMATODE DISEASES:

Soybean Cyst Nematode (*Heterodera glycines*)  
☐ Race 1   ☐ Race 2   ☐ Race 3   ☐ Race 4   ☐ Other (Specify) should be same as Williams but not tested  
☐ Lance Nematode (*Hoplaimus Colombus*)  
☐ Southern Root Knot Nematode (*Meloidogyne incognita*)  
☐ Northern Root Knot Nematode (*Meloidogyne Hapla*)  
☐ Peanut Root Knot Nematode (*Meloidogyne arenaria*)  
☐ Reniform Nematode (*Rotylenchulus reniformis*)  
☐ OTHER DISEASE NOT ON FORM (Specify) \_\_\_\_\_ should be same as Williams but not tested

## 20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Iron Chlorosis on Calcareous Soil  
☐ Other (Specify) \_\_\_\_\_

## 21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Mexican Bean Beetle (*Epilachna varivestis*)  
☐ Soybean Leaf Hopper (*Emmonasca fabae*)  
☐ Other (Specify) \_\_\_\_\_

## 22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Williams	Seed Coat Luster	Williams
Leaf Shape	Williams	Seed Size	Williams
Leaf Color	Williams	Seed Shape	Williams
Leaf Size	Williams	Seedling Pigmentation	Williams

## 23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	PLANT SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/POD
				CM Width	CM Length	% Protein	% Oil		
W20 Submitted	128.1	59%	95.4						
Williams Name of Similar Variety	131.4	55%	98.1						

## PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A<sub>2</sub> in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

14E. Exhibit E - Basis of Applicant's Ownership

The soybean variety, W20, for which Plant Variety Protection is hereby sought was developed by Dr. Scott A. Sebastian, an employee of E. I. du Pont de Nemours and Company. By agreement between Dr. Sebastian and Du Pont (Dr. Sebastian's Employment Contract) all rights to any invention, discovery, development, patent, or other intellectual property made by Dr. Sebastian while employed by Du Pont have been assigned to Du Pont with no rights of any kind retained by Dr. Sebastian.